



Seit 1877

**Kiefer**

Luft- und Klimatechnik

Neue Wege mit Luft

# Chilled-ceiling Panel INDUCOOL-Compact

Cooling with air and water





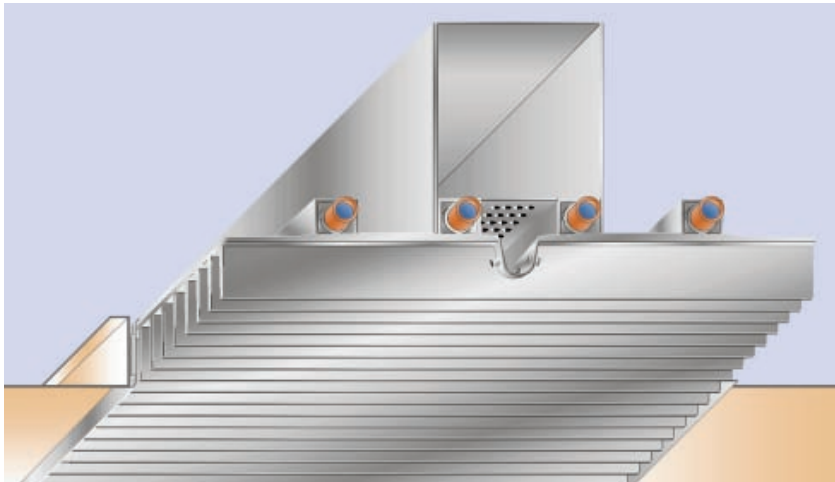
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## Effective Cooling with Less Energy



Functional, visually attractive and cost-effective – that's how chilled ceiling systems should be. When building owners, architects and planners decide in favour of a particular system, accurate expense and performance comparisons are just as important as confidence in the manufacturer's extensive experience.

INDUCOOL chilled ceiling panels from Kiefer are outstandingly suitable for use in widely differing building projects, because INDUCOOL is a system which keeps the required energy especially low and, at the same time, provides a noticeable improvement in the quality of air in a room.

### Function and Performance

These chilled ceiling panels have fine ribs on the room side through which a surface area eight-times as large can be covered. Outdoor air is fed to these water-cooled panels. This procedure improves heat transfer and increases the cooling capacity substantially. It is sufficient if the

chilled ceiling panels cover only 5-10 percent of the ceiling surface. A cooling water network covering the whole surface is not required. Other installations and equipment in the ceiling hollow space remain to a large extent freely accessible. Using these chilled ceiling panels, a cooling capacity of up to 500 W/m can be achieved, depending on dimensioning.

### Freedom in Ceiling Design

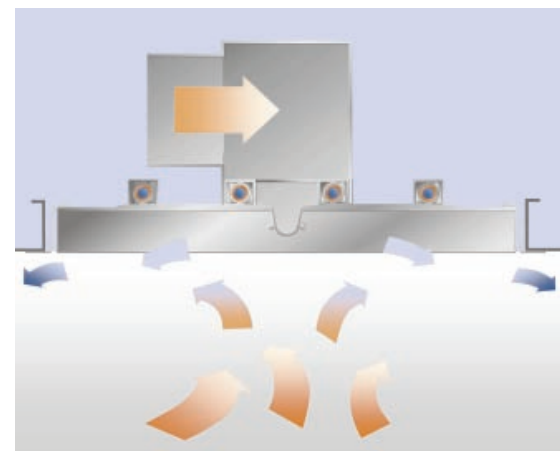
INDUCOOL can be installed just as easily in sophisticated ceiling designs as in standard ceilings. These chilled ceiling panels offer the architect a great deal of freedom in ceiling design with the choice of continuous strips or single panels at selected locations.

### INDUCOOL exploits all the Energy Advantages of Air-Water Systems:

- Cooling by air and water is integrated into a single element.

- Most of the thermal energy is removed quickly and economically by cooling water.
- Exploiting the cooling potential of outside air reduces energy costs.
- Chilled ceiling panels only 30 cm wide extract the cooling load.
- These chilled ceiling panels require only 5-10 percent of ceiling area.
- Used and contaminated air is replaced by fresh, outdoor air; only the addition of fresh, outdoor air can ensure high-quality room air.
- Simultaneously, INDUCOOL uses cooler outdoor air (with an average mean annual temperature of 8-10 °C) for free cooling of the room – impossible with most other systems.

Decades of experience in the field of ventilation and air-conditioning technology, a continual exchange of information with planners and users, and the latest in laboratory equipment have fed into the development of this high performance chilled ceiling system: INDUCOOL from Kiefer.





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## Technical and Economical Advantages of the System



Photo © Wilhelm Mierendorf

INDUCOOL in the House of the Press, Stuttgart

### Low Energy Consumption

INDUCOOL is the system solution for lowest energy costs.\* The cooling load is extracted with air and water. Primarily, INDUCOOL uses cooling water, because it is the most economical way of transporting heat, and, employs just the necessary amount of outdoor air without recirculation for air delivery. The cooling capacity of the outdoor air, which has a high temperature difference of up to  $-12\text{ K}$ , is used for additional cooling. This avoids high energy costs due to the thermally-unfavourable treatment of displacement air.

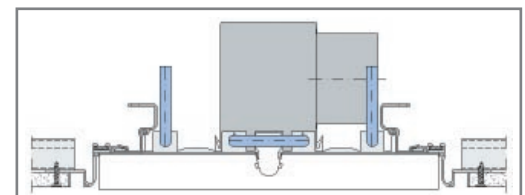
### Greater Comfort

Users desire fresh air, not just thermal comfort. If the room air temperature rises to  $26-28\text{ }^{\circ}\text{C}$ , even when

the air is sufficiently humid, people in the room will experience a feeling of dryness in their upper respiratory passages. Fresh air is, in the first instance, cooled and adequately dehumidified outdoor air at a room temperature of  $22-24\text{ }^{\circ}\text{C}$ . This optimum is best achieved with air-water cooling on the INDUCOOL principle. INDUCOOL creates a diffuse, low-turbulence flow of air in a room, and does not influence the convective upflow adjacent to an occupant's body.

### Greater Range of Performance

INDUCOOL chilled ceiling panels bring measurable advantages due to their greater cooling load and specific volume flow ranges. Depending on the density of the installation, and the performance range selected, a cooling load of



INDUCOOL elements with KL3-GK air-guide profile for installation in plaster ceilings

more than  $100\text{ W/m}^2$  and a specific air flow rate of  $5...40\text{ m}^3/\text{hm}^2$  can be achieved. In this way, the dimensioning\*\* of a system can be adapted to all requirements. If the utilisation of a room changes, a simple change to the arrangement will enable higher cooling loads and air flow rates to be realised, greater than those originally intended. INDUCOOL chilled ceiling panels from Kiefer are more flexible than conventional systems and suitable for a wide range of applications.

\* We will supply detailed energy cost calculations to VDI 2067/3 on request.

\*\*For dimensioning, please see our Technical Information INDUCOOL.

We will be pleased to provide you with arrangement and dimensioning proposals.





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## INDUCOOL in Public Buildings

### Variable Frequentation

Places in a building where many people congregate call for a sophisticated energy management solution capable of fulfilling stringent requirements, e.g. in public buildings, hotels, restaurants, museums and shopping malls. Compared to constant cooling loads, the number of visitors at any given time may vary considerably, and with it the need for outdoor air.

With INDUCOOL chilled ceiling panels, it is possible to achieve optimum adaptation of the energy input. The air flow can be varied to suit the frequentation (VVS system), and the then-constant cooling load, at least when the outdoor temperature is high, extracted by means of

cooling water. With their energy advantages, INDUCOOL chilled ceiling panels enable optimum economical advantages and permit substantial savings in energy. High, constant heat loads from lighting installations have to be taken into account as well.

### Flexibility for Modification

In department stores and retail shops, sales areas are frequently rearranged. A new tenant or a change in the surfaces used and how areas are used also demands a high degree of flexibility in air distribution and cooling systems; cooling loads and air flow rates should be easy to adapt to new circumstances. With Kiefer INDUCOOL chilled ceiling panels, this can be

done without difficulty by modifying the dimensioning and the spacing of the elements. On the ventilation side, the air flow can range from 7.5...10 m<sup>3</sup>/hm<sup>2</sup> – typical dimensioning for offices – up to as much as 30...40 m<sup>3</sup>/hm<sup>2</sup>.

This wide performance range can be exploited to give cost savings both when a system is first installed and when it is later modified. A practical advantage is that only 5 to 10 percent of the ceiling area is required for active chilled ceiling panels. The remaining area is freely available for lighting, design features and decoration. Because there is no need for an extensive cooling-water installation, the ceiling hollow space remains to a great extent freely accessible.



INDUCOOL in the Hotel Le Royal Méridien in Hamburg. Sophisticated technological and design requirements are combined in a harmonious, functional whole.

Photo © Joi-Design Hamburg



Photo © Anna Blau

EURO PLAZA, Vienna

#### The strengths of INDUCOOL:

- Low energy consumption
- Large thermal comfort
- Supply of fresh outdoor air
- Greater range of performance
- Flexible installation

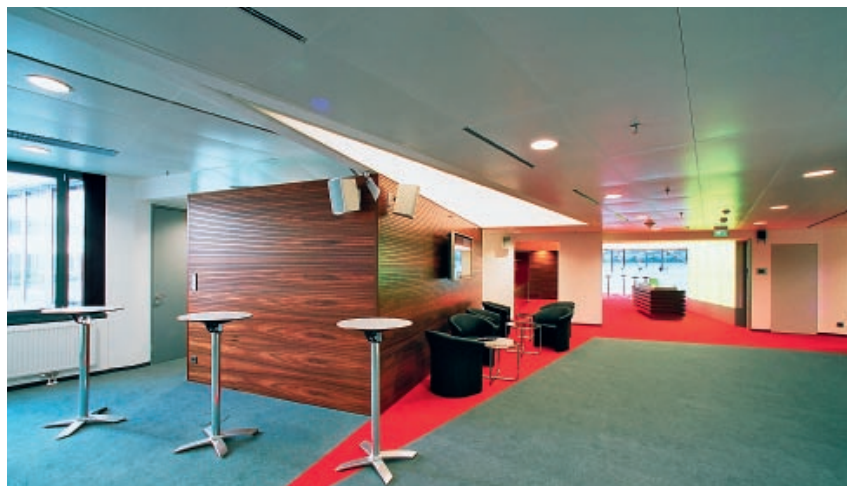
#### Proven INDUCOOL technology – successful in numerous projects:

- Office and administration buildings
- Banks and building societies
- Hotels and museums
- Conference centres
- Department stores
- Retail shops

#### INDUCOOL in the EURO PLAZA, Vienna

The technical standard of the EURO PLAZA office complex is currently the highest in Vienna.

The combination of modern architecture and elegantly designed facades with external sun screens, false floors, suspended ceilings, chilled ceiling panels, individually controlled ventilation, and an open-plan concept for flexible usage in the centre of Vienna has attracted wellknown companies, for example, Asfinag, AT&S, Danone, EMC, Hewlett-Packard, Kapsch, L'Oréal, Microsoft, Schering, Steelcase, Strauss & Partner and many others.



Photos © Anna Blau



## Experts for air conditioning



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- Consulting and planning for ventilation and air conditioning systems
- Linear diffusers
- Chilled ceilings
- Concrete core cooling with supply air
- System construction comfort air conditioning
- System construction industrial air conditioning
- Building management
- Maintenance service
- Asbestos decontamination

